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10/609,893	06/30/2003	Sergei F. Kolomeitsev	VAL 158 P2	8376

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EXAMINER	
ROMAN, LUIS ENRIQUE	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,893	KOLOMEITSEV, SERGEI F.	
	Examiner	Art Unit	
	Luis Roman	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 30 June 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 10/28/03, 11/08/04, 05/02/05 LR
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Regarding to Claim 10 there is two limitations itemized with the letter "***c***". Appropriate correction is required.

Regarding to Claim 21 ***"...a permanent magnet rotor and M three-phase pole, groups, said..."*** which has an extra comma. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C.102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) The invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.
>
> The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 18, 19 & 21 are rejected under 35 U.S.C. §102(e) as being anticipated by Stridsberg (US 6885162).

Regarding to claim 18 Stridsberg discloses a method (a person of the ordinary skill will understand a method that is intrinsically described by the functioning of the apparatus) of reducing adverse effects of a short (col. 1 lines 46-49) in a stator of a 3-phase DC automotive steering motor (phases 101, 102, 103 corresponding to U, V, W) of a type having a permanent magnet rotor, and a wire wound stator (abstract) provided with 6 poles (Fig. 3 elements corresponding to $U_{1\text{-}6}$, $V_{1\text{-}6}$, $W_{1\text{-}6}$, respectively), said method comprising the steps of:
(1) organizing said 6 poles into 2 groups of 3 poles each (col. 4 lines 17-19);
(2) detecting said short (through sensor 302 in Fig. 3 & abstract);
(3) identifying the pole wherein said short occurred (col. 2 lines 49-60),
(4) identifying the pole group of the failed pole (Fig. 4 element 403), and

(5) terminating current flow to all poles in the pole group of the failed pole (abstract, last sentence, col. 2 lines 32-40 and 61-65 & col. 12 lines 1-11).

Regarding to claim 19 Stridsberg discloses a method according to claim 18 further comprising the step of:
Stridsberg further discloses wherein:
(6) physically placing all poles assigned to a first one of said two pole groups semi-circularly side-by-side (Fig. 2); and
(7) physically placing all other ones of said poles diametrically opposite corresponding poles of said first one of said two pole groups (Fig. 2).

Regarding to claim 21 Stridsberg discloses a method of ameliorating the effect of a short in a brushless DC induction motor having a permanent magnet rotor and M three-phase pole, groups (col. 1 lines 46-49), said method comprising the steps of:
(1) detecting the occurrence of said short (col. 2 lines 49-60);
(2) identifying a pole group in which said short occurred (Fig. 4 element 403) ; and
(3) disabling all poles in said pole group, so that poles which are not members of said pole group are available for countering drag torques arising as a consequence of said short (abstract, last sentence, col. 2 lines 32-40 and 61-65 & col. 12 lines 1-11).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 20, 22 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stridsberg (6885162) in view of O'Gorman (US 6392854).

Regarding to claim 1 Stridsberg discloses a system comprising a DC motor having a permanent magnet rotor and a stator (col. 10 lines 28-30) including 2m poles (col. 4 lines 24-27) subject to shorts (col.2 lines 59-60), the improvement wherein said poles are organized into first and second m-phase groups (col. 4 lines 24-27), said system further comprising: means for detecting a short in any of said poles, and means for disabling all of said poles within the m-phase group of a said pole which has been so detected (col. 2 lines 57-65).

Stridsberg does not disclose any specific application associated with the system. However O'Gorman teaches a brushless motor system for use as an automotive steering assist system.
It would have been obvious to one having ordinary skill in the art at the time the invention was made that the brushless DC motor system of Stridsberg may be used as an automotive steering assist system to provide to O'Gorman device with a system for controlling rotational movement which is highly reliable.

Regarding to claim 2 Stridsberg in view of O'Gorman discloses the automotive steering assist system improvement according to claim 1.
Stridsberg further discloses wherein m=3 (col. 10 lines 7-11).

Regarding to claim 3 Stridsberg in view of O'Gorman discloses the automotive steering assist system improvement according to claim 2.
Stridsberg further discloses wherein all of said poles within any said pole group are wye connected at a null point (col. 10 lines 7-11).

Regarding to claim 4 Stridsberg in view of O'Gorman discloses the automotive steering assist system improvement according to claim 2.
O'Gorman further discloses the system further comprising means for delivering pulse width modulated driving signals to said poles (col. 4 lines 38-48).

Regarding to claim 5 Stridsberg in view of O'Gorman discloses the automotive steering assist system improvement according to claim 4.
Stridsberg further discloses wherein said motor comprises a permanent magnet rotor and a wire-wound stator (col. 9 lines 9-11), said stator having a generally circular cross-section (Fig. 10) and being wound to define six radially extending poles (Fig. 10), which are circularly positioned at regular 60 degree intervals (They are equidistant, which can be seen in Fig. 10).

Regarding to claim 6 Stridsberg in view O'Gorman of discloses 6.
Stridsberg further discloses wherein said stator is provided with eighteen radially extending spokes (Fig. 2 at the center of each winding in the stator is shown an spoke element), circularly positioned at regular 20 degree intervals (Fig. 2, 360 degrees divided by 18 windings equals 20 degrees), said poles being wound on every third one of said spokes.

Regarding to claim 7 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 5.
Stridsberg further discloses wherein said first m-phase group comprises three adjacent ones of said poles (Fig. 2 elements V_{1-3}), and said second m-phase group comprises three of said poles (Fig. 2 elements V_{4-6}), diametrically opposing said poles of said first m-phase group (Fig. 2, m=3 phases U, V, W).

Regarding to claim 8 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 5.
Stridsberg further discloses comprising means for delivering pulse width modulated driving signals to said poles (col. 6 lines 15-17).

Regarding to claim 9 Stridsberg in view O'Gorman of discloses an automotive steering assist system improvement according to claim 3.
O'Gorman further discloses comprising means for delivering pulse width modulated driving signals to said poles (col. 4 lines 38-48).

Regarding to claim 10 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 9.
O'Gorman further discloses wherein said means for delivering pulse width modulated driving signals to said poles comprises.
(a) a DC power source (Fig. 5 element 102 (+));
(b) a DC power sink (Fig. 5 element 102 (-));
(c) computing means for generating pulse-width modulated command signal (Fig. 5 element 410)
(d) a pair of inverters (Fig. 1 elements 106a, 106d) of like construction, each comprising. a set of switches connected for directing a flow of current between one of said 3-phase groups of poles (Fig. 1 elements 104a, 104b, 104c) and either said DC power source or said DC power sink (Fig. 1 element 102), the direction of said Y flow of current being toggled in accordance with the binary state of said pulse-width modulated command signal.

Regarding to claim 13 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 2.
Stridsberg further discloses wherein all of said poles within any said pole group are wye connected at a null point (col. 10 lines 7-11).

Regarding to claim 14 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 13.
Stridsberg further discloses that comprising means for delivering pulse width modulated driving signals to said poles (col. 6 lines 15-17).

Regarding to claim 15 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 14.
Stridsberg further discloses wherein said motor comprises a permanent magnet rotor and a wire-wound stator (col. 10 lines 28-32 & col. 9 lines 9-11), said stator having a generally circular cross-section (Fig. 10) and being wound to define six radially extending poles (col. 10 lines 10-11 & Fig. 10), which are circularly positioned at regular 60 degree intervals (This means they are equidistant, which can be seen in Fig. 10).

Regarding to claim 16 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 15.
Stridsberg further discloses wherein said stator is provided with eighteen radially extending spokes (Fig. 2 at the center of each winding in the stator is shown an spoke element), circularly positioned at regular 20 degree intervals (Fig. 2, 360 degrees divided by 18 windings equals 20 degrees), said poles being wound on every third one of said spokes.

Regarding to claim 17 Stridsberg in view of O'Gorman discloses an automotive steering assist system improvement according to claim 15.
Stridsberg further discloses wherein said first m-phase group comprises three adjacent ones of said poles (Fig. 2 elements $V_{4\text{-}6}$), and said second m-phase group comprises three of said poles (Fig. 2 elements $V_{4\text{-}6}$), diametrically opposing said poles of said first m-phase group (Fig. 2, m=3 phases U, V, W).

Regarding to claim 20 Stridsberg in view of O'Gorman discloses a method according to claim 19.
O'Gorman further comprising wherein said step of terminating current flows is carried out by using pulse-width-modulated signals to turn off transistors supplying current to poles in the pole group of the failed pole (col. 4 lines 38-48).

Regarding to claim 22 Stridsberg in view of O'Gorman discloses a method according to claim 21.
Stridsberg further discloses wherein the value of M is 2 (Stridsberg teaches that the value of N may vary. Therefore it may be 2 - col.10 lines 10-11).

Regarding to claim 23 Stridsberg in view of O'Gorman discloses a method according to claim 22.
Stridsberg further discloses the step of operating said poles, which are not members of said pole group (col. 12 lines 1-11). This may be used to assist an operator in the steering of an automotive vehicle.

Claims 11 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Recker et al. (US 6845309) in view of Stridsberg (6885162).

Regarding to claim 11 Recker et al. discloses a motor vehicle steering system having a manually operated steering wheel and direction control apparatus responsive to rotational movement of said steering wheel by causing a directional change of said motor vehicle (abstract), steering assistance apparatus comprising,
(a) first sensor for generating a first sensing signal indicative of torque being applied to said steering wheel (col. 4 lines 62-63 Fig. 4 element 43);
(b) a second sensor for generating a second sensing signal indicative of a rotational position of said steering wheel (col. 4 lines 65-66 Fig. 4 element 66);

(c) computing apparatus programmed to read said first and second sensing signals (Fig. 4 element 60), and to generate torque assist command signals therefrom, said torque assist command signals being directed into two separate, m-phase, torque assist channels (col. 5 lines 3-6).
Recker et al. does not disclose,
(d) a motor having a permanent magnet rotor and a wire wound stator, said stator being provided with 2 groups of m-phase wire wound poles, the poles in each of said pole groups being connected for receiving torque assist commands transmitted by one of said torque assist channels, and able to generate the corresponding torques; and
(e) a short detector for appraising said computing apparatus concerning the existence of shorts in said stator, said computer being programmed to generate control signals which switch off current to the windings of all poles within any channel in which a short has been detected.
Stridsberg teaches,
(d) a motor having a permanent magnet rotor and a wire wound stator, said stator being provided with 2 groups of m-phase wire wound poles, the poles in each of said pole groups being connected for receiving torque assist commands transmitted by one of said torque assist channels, and able to generate the corresponding torques (abstract); and
(e) a short detector for appraising said computing apparatus concerning the existence of shorts in said stator, said computer being programmed to generate control signals which switch off current to the windings of all poles within any channel in which a short has been detected (abstract).
It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Recker et al. device with the motor of Stridsberg which dramatically reduces the risk of phase to phase shortages, is capable of delivering torque or power even with a ground to phase shortage, when a short circuit inside a phase winding, or when a permanently open power switch, a permanently shortened power switch, or various types of failure causes abnormal heating of windings parts.

Regarding to claim 12 Recker et al. in view of Stridsberg discloses a steering assistance apparatus according to claim 11.
Stridsberg further discloses wherein m=3 (col. 10 lines 7-11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is (571) 272-5527. The examiner can normally be reached on Mon – Fri from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

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